(276) C4 fr 74 171



STATE OF CALIFORNIA & GOODWIN J. KNIGHT, Governor

DEPARTMENT OF NATURAL RESOURCES

DEWITT NELSON, Director

DIVISION OF MINES

FERRY BUILDING, SAN FRANCISCO 11 OLAF P. JENKINS, Chief

SAN FRANCISCO

BULLETIN 171

NOVEMBER 1955

EARTHQUAKES IN KERN COUNTY CALIFORNIA DURING 1952

(A symposium on the stratigraphy, structural geology, and origin of the earthquakes; their geologic effects; seismologic measurements, application of seismology to petroleum exploration; structural damage and design of earthquake-resistant structures.)

Prepared Under the Direction of OLAF P. JENKINS
GORDON B. OAKESHOTT, Editor



S. MENLO PARK

JUN 2 6 1987

LIBRARY

Price \$4.00

9114

CONTENTS

PAR	T I-GEOLOGY
1.	The Kern County earthquakes in California's geologic history, by Gordon B. Oakeshott
2.	Geology of the southeastern margin of the San Joaquin Valley, California, by T. W. Dibblee, Jr
3.	Kern Canyon lineament, by Robert W. Webb
	Nature of movements on active faults in southern California, by Mason L. Hill
	Geological effects of the Arvin-Tehachapi earthquake, by J. P. Buwalda and Pierre St. Amand
6.	Ground fracture patterns in the southern San Joaquin Valley resulting from the Arvin-Tehachapi earthquake, by Archer H. Warne
7.	Arvin-Tehachapi earthquake damage along the Southern Pacific Railroad near Bealville, California, by Donald H. Kupfer, Siegfried Muessig, George I. Smith, and George N. White
8.	Measurements of earth movements in California, by C. A. Whitten
9.	Effect of Arvin-Tehachapi earthquake on spring and stream flow, by Revoe C. Briggs and Harold C. Troxell
	Water-level fluctuations in wells, by G. H. Davis, G. F. Worts, Jr., and H. D. Wilson, Jr.
11.	Seismic prospecting for petroleum and natural gas in the Great Valley of California, by J. L. Soske
12.	Application of seismic methods to petroleum exploration in the San Joaquin Valley, by Maurice Sklar
PAF	T II—SEISMOLOGY
1.	General introduction to seismology, by H. Benioff and B. Gutenberg
2.	The major earthquakes of California: a historical summary, by V. L. VanderHoof
3.	Seismic history in the San Joaquin Valley, California, by C. F. Richter
	Seismograph development in California, by H. Benioff
	Seismograph stations in California, by B. Gutenberg
	Epicenter and origin time of the main shock on July 21 and travel time of major phases, by B. Gutenberg
	The first motion in longitudinal and transverse waves of the main shock and the direction of slip, by B. Gutenberg
	Magnitude determination for larger Kern County shocks, 1952; effects of station azimuth and calculation methods, by B. Gutenberg
9.	Foreshocks and aftershocks, by C. F. Richter
	Mechanism and strain characteristics of the White Wolf fault as indicated by aftershock sequence, by H. Benioff
	Relation of the White Wolf fault, to the regional tectonic pattern, by H. Benioff
12.	Strong-motion records of the Kern County earthquakes, by Frank Neumann and William K. Cloud

CONTENTS—Continued

PART III—STRUCTURAL DAMAGE	211		
 Arvin-Tehachapi earthquake—structural damage as related to geology, by J. Schlocker and Dorothy H. Radbruch 	213		
2. Earthquake damage to oil fields and to the Paloma cycling plant in the San Joaquin Valley, by Robert L. Johnston	221		
3. Highway damage resulting from the Kern County earthquakes, by O. W. Perry, with supplement, Bridge earthquake report, Arvin-Tehachapi earthquake, by Stewart Mitchell	227		
4. Damage to water works systems, Arvin-Tehachapi earthquake, by H. B. Hemborg	235		
5. Damage to electrical equipment caused by Arvin-Tehachapi earth-quake, by G. A. Peers	237		
6. Earthquake damage to railroads in Tehachapi Pass, by Southern Pacific	241		
7. Earthquake damage to elevated water tanks, by Karl V. Steinbrugge and Donald F. Moran	249		
8. Earthquake damage to California crops, by Karl V. Steinbrugge and Donald F. Moran	257		
9. Structural damage to buildings, by Karl V. Steinbrugge and Donald F. Moran	259		
10. The design of structures to resist earthquakes, by G. W. Housner	271		
PLATES			
Plate 1. Geologic map and sections of southern Sierra Nevada, Tehachapi, and San Joaquin ValleyIn pocket			
2. Map of the White Wolf fault zoneIn p	ocket		
References cited in Bulletin 171	279		
Finding list of authors			

Finding list of titles______ 283